Journal of Lie Theory 25 (2015) 1045–1071

J. Pantoja
Instituto de Matemáticas, Universidad Catolica, Blanco Viel 596, Valparaíso, Chile
jpantoja@ucv.cl

J. S. Andrade
Dep. de Matemáticas, Universidad de Chile, Las Palmeras 3425, Santiago, Chile
sotoandrade@u.uchile.cl

J. A. Vargas
FAMAF-CIEM, Ciudad Universitaria, 5000 Córdoba, Argentina
vargas@famaf.unc.edu.ar

On the Construction of a Finite Siegel Space

We construct a finite analogue of classical Siegel's Space. This is made by generalizing Poincaré half plane construction for a quadratic field extension $E \supset F$, considering in this case an involutive ring A, extension of the ring fixed points $A_0 = A^{\Gamma}$, (Γ an order two group of automorphisms of A), and the generalized special linear group $SL_*(2, A)$, which acts on a certain $*-$ plane $\mathcal{P}_{\mathcal{A}}$. Classical Lagrangians for finite dimensional spaces over a finite field are related with Lagrangians for $\mathcal{P}_{\mathcal{A}}$. We show $SL_*(2, A)$ acts transitively on $\mathcal{P}_{\mathcal{A}}$ when A is a $*-$ euclidean ring, and we study extensibly the case where $A = M_n(E)$. The structure of the orbits of the action of the symplectic group over F on Lagrangians over a finite dimensional space over E are studied.

Keywords: Finite Siegel half space, star-analogue.

MSC: 20G40; 11E16, 14M20, 17B10